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285. By *W. E. Heal, Wheeling, Ind.* — If $E(e, x)$ denote the length of an elliptic arc, semi major axis unity and eccentricity e ; prove, without the aid of the Integral Calculus, that

$$d E(e, x) = dx \sqrt{\left(\frac{1 - e^2 x^2}{1 - x^2} \right)}.$$

286. By *Geo. M. Day, Lockport, N. Y.* — Three points are taken at random in a given circle, and a circle is drawn through them. What is the probability that the circle through the random points will be wholly in the given circle.

287. By *G. H. Harvill, Bonner, La.* — A ladder, 40 feet long, stands upright against a vertical wall, on a horizontal plane. A boy ascends the ladder, at a uniform rate, and at the same time the foot of the ladder slides out horizontally at the same uniform rate. How long is the boy's path?

288. By *Prof. E. J. Edmunds, New Orleans, La.* — Two circles are tangent to a given line AB ; from a point C , on the line AB the other tang'ts, to the two circles, CM and CN , are drawn. Find the envelop of MN , and the locus of its middle point.

Query. By *Chas. H. Kummell, Assist. U. S. Lake Survey, Detroit, Mich.* — Prove, otherwise than by induction, that

$$2^{n-1} = \sum_0^{n-1} \left\{ \frac{n+m-1}{1} \cdot \frac{n+m-2}{2} \dots \frac{n}{m} \left(\frac{1}{2} \right)^m \right\}$$

if m n are positive integers, and give, if possible a value for

$$\sum_0^{n-1} \left\{ \frac{n+m-1}{1} \cdot \frac{n+m-2}{2} \dots \frac{n}{m} x^m \right\}$$

which reduces to 2^{n-1} for $x = \frac{1}{2}$.

ANNOUNCEMENT OF VOL. VII. — With this No. is completed the sixth annual volume of the ANALYST. And, though we have not been able to make any great improvement in its mechanical execution, we trust that, in respect to the subject-matter presented in its pages, it has not deteriorated in the late volumes, but that, on the other hand, it has steadily improved; and we feel flattered that many of our ablest contributors have expressed a desire that the publication may be continued. We take pleasure, therefore, in announcing that we have made definite arrangement for the publication of Vol. VII; and, if our health permits, we hope, and expect, to be able to publish other additional volumes.

As many of our readers are sufficiently interested in the problems proposed in each No. to furnish solutions in detail, of one or more, for publication, we embrace this opportunity to say that, in general, our publication is mailed about the 25th of the month preceding the one named under its title, and that only solutions that are rec'd on or before the 10th preceding the 25th above named, are included in the regular notice of solutions rec'd.

Though we do not desire to make the solution of questions a prominent feature of our publication, yet we think about one-fourth of its space may be profitably devoted to that purpose; we suggest, however, that the efforts of many of our contributors, in the solution of problems, should be *concentrated*. One solution well made is worth more, for our purpose, than half a dozen careless and imperfect solutions. And, when diagrams are required for illustration, they should be neatly drawn, of as small dimensions as is practicable, and detachable from the solutions, so that they can be sent to the engraver while the solution is in the hands of the compositor. Many solutions go into the waste basket for want of compliance with the above named obvious conditions.

EDITOR.

PUBLICATIONS RECEIVED.

The Elements of Co-ordinate Geometry. In Three Parts. I. Cartesian Geometry. II. Quaternions. III. Modern Geometry, and an Appendix. By DE VOLSON WOOD, Prof. of Mathematics and Mechanics in Stevens Institute of Technology. 329 pp., 8vo. New York: John Wiley and Sons. 1879.

In the first part of this work, comprising 228 pp., the subjects usually presented in works on Analytical Geometry are discussed and illustrated by numerous examples. The second part occupies 70 pages, and is devoted, as the title imports, to a discussion of the Elements of Quaternions: this part will be found especially interesting to students who have not read more extended discussions of the subject. "Modern Geometry" occupies 14 pages, and discusses briefly the various systems of co-ordinates which have been introduced since the Cartesian system was recognized. In the Appendix (13 pp.) we have a historical sketch of the development of the doctrine of Quaternions; from which it appears that, though the method has been elaborated mainly through the labors of Sir Wm. R. Hamilton, the seeds of the doctrine have germinated in many minds, stimulated by a desire to explain a recognized fact.

The Canada School Journal. 24 pp., 4to: Published monthly at Toronto, Canada; has a Mathematical Department edited by Alfred Baker, M. A.

ERRATA.

On page 259 [159], line 21, for $\alpha\Delta$, read $c\Delta$.

" " 166, " 12, for $.01+\&c.$, read $.01u'+\&c.$